

LEADING & LEARNING BY DOING

PNW Innovators Deploying RH2



LEADING WITH PROJECTS

A top priority in the PNW Renewable Hydrogen (RH2) Action Plan is to “Lead With Projects” by investing in and building RH2 deployment hubs. The Northwest is home to a growing constellation of early-movers, pioneering partnerships and policies to accelerate production and use of RH2.

For example:

Douglas PUD

Douglas PUD secured \$250,000 from the 2020 Legislature for engineering studies for an electrolyzer to be operated using electricity from their Wells Hydroelectric Project and \$1.5 million from the 2021 WA Legislature to build a publicly available RH2 fueling station (and a co-located DC fast-charging infrastructure) in the East Wenatchee/Wenatchee area, very likely at the location of their electrolyzer. Plans are underway to install their first 5 MW hydrogen electrolyzer that will produce up to 2 tons of renewable hydrogen per day. Construction began in the spring of 2021 with production anticipated by the end of 2021. The hydrogen will be used to fuel various alternative fuel vehicles and industrial uses. The system consists of electrolyzers, electrical MCC equipment, SCADA and control systems, compressors, cooling systems, and interconnecting piping systems. Additionally, there will be onsite storage and fueling equipment for fueling tube trailers. Permitting and site planning is complete. There may be additional storage or compression equipment purchase in future years. Additionally, Douglas PUD has been working closely with Washington State legislators to advance renewable hydrogen legislation and funding opportunities.

Tacoma Power

Tacoma Power became the first utility in the nation in April 2021 to offer a tariff specifically designed to recognize the flexibility of electrolytic load and offer a special rate to producers of electrolytically formed hydrogen and liquid hydrogen carriers generated by Tacoma's clean and renewable power. This act has created significant interest from developers who are interested in making Tacoma a green hydrogen hub for transportation, industrial feedstocks, and energy storage/grid stability. Tacoma Power welcomes all opportunities to partner with interested parties to develop production, distribution, and end-use applications of electrolytically generated fuels in the South Sound region.

The Bonneville Environmental Foundation (BEF)

BEF is a 501c3 nonprofit that has been breaking down barriers to renewable energy adoption for the past two decades. BEF strongly believes in the value of learning by doing and has focused on advancing RH2 projects that benefit the electricity system and the climate. BEF has forged several project development partnerships to do just that:

- A partnership of BEF, Douglas County Public Utility District, Toyota Motors North America, the Centralia Coal Transition Grants Board, and Twin Transit has secured nearly \$7m to implement the first RH2 production and fueling station infrastructure in the region.
- BEF expects to bring to Washington State the first fuel cell electric busses and the first fleet of fuel cell electric vehicles such as the Toyota Mirai which will increase the understanding and awareness of hydrogen and fuel cell technology.
- Along with development partner Northwest Green Hydrogen, BEF has also embarked on a large-scale RH2 production facility. The Tacoma Green Hydrogen project is designed to utilize up to 65MW of electric capacity to produce up to 20 metric tonnes per day of liquid renewable hydrogen fuel to serve industrial and transportation markets.

For reference, if the output of the plant were to serve the passenger vehicle market it would provide enough fuel to run 50,000 cars for a year. Served by a first of its kind "electrofuels rate" from Tacoma Power, the project will be able to access lower cost renewable power, in exchange for flexibly operating the electrolytic hydrogen production. Given the recent passage of a low carbon fuel standard in Washington State, the entire West Coast now has a regulatory environment that makes clean fuels lower cost than gas or diesel. The late-stage development will be offered for sale later this summer.

Goldendale, WA

Klickitat Valley Hospital (KVH) is an important anchor for the region, both as its main health care provider and as a major contributor to the local economy. In response to aging energy infrastructure challenges, KVH developed a visionary approach centered on a resilient, renewable energy-based microgrid and thermal district that would efficiently and reliably serve the power, heating and cooling needs of not just the hospital, but also nearby schools and community facilities, even when the regional power grid goes down in times of disruption.

The Washington Legislature committed over \$3 million for the 2021-2023 biennium for KVH to purchase a hydrogen fuel cell to power the microgrid, providing the cornerstone for this innovative project to move forward. KVH anticipates becoming an early customer of renewable hydrogen produced at Douglas PUD, demonstrating how RH2 can be part of the solution even for struggling rural health care providers.)

Obsidian Renewables

Obsidian was a pioneer in developing utility-scale solar power projects in Oregon. Obsidian is now developing leading renewable energy projects pairing purpose-built solar with electrolyzers to manufacture green hydrogen, with a focus on industrial applications and hard to decarbonize situations. Obsidian's focus is the rural sunny parts of the Pacific Northwest. The prospect of opening up new renewable development in sunny rural areas of the region holds great economic opportunity where opportunities are too-often in limited supply.

The project development team is working on renewable hydrogen industrial parks, hydrogen for displacing natural gas use, renewable hydrogen for creating other synthetic fuels and ammonia, and in transportation applications. The sky is the limit on this new industry and Obsidian is setting itself to lead the emerging opportunity in the Pacific Northwest.

PACCAR

PACCAR is producing a limited number of hydrogen-powered semi-trucks in partnership with Toyota as a research and development project.

Mitsubishi Power Systems & Puget Sound Energy

These partners recently announced an agreement to collaborate on renewable hydrogen production, storage and pipeline facilities within PSE's service area.

Columbia Hyfuel

Columbia Hyfuel has launched an initiative to bring zero-emission, fuel cell electric Class 8 trucking to the Pacific Northwest. Northwest Zero-Emission Freight Corridors begins with two heavy-duty hydrogen refueling sites at the ports of Tacoma and Seattle, enabling round-trip duty cycles to transload distribution centers in the Kent Valley, to the ports of Portland and Vancouver, BC, and to agricultural producers near Ellensburg—replacing 1700 diesel trucks. Subsequent phases will extend eastward on the I-90, I-82 and I-84 corridors to cities east of the Cascades range, and south on I-5 through Oregon to California.

Not merely a task of building H2 stations, the initiative will build both sides of the HD H2 transportation economy at the same time, acquiring the Class 8 tractors on behalf of carrier fleets, matching hydrogen production to FCE trucks on the road. To fulfill the call for RH2 deployment hubs, hydrogen production at the initial port sites can be expanded to also serve material handling, yard tractors, ferries and other port uses.

Twin Transit

The 2021 Washington Legislature committed \$2.55 million for a renewable hydrogen fueling station in the Centralia area, providing a critical link for future RH2 fueling in the I-5 corridor located strategically halfway between the Seattle and Portland metropolitan areas.

Northwest Natural

Northwest Natural is working with RHA members Eugene Water and Electric Board (EWEB), Bonneville Environmental Foundation, and others to explore RH2 production using low-carbon and renewable electricity. The proposed project would combine RH2, produced onsite in Eugene, with carbon dioxide, a waste byproduct captured from a nearby industrial customer, and then fed into NW Natural's gas supply as a low-carbon fuel. NW Natural has also begun running tests of hydrogen blends in end-use equipment and systems at our Sherwood Operations and Training Center to validate third-party safety and reliability study results.



POLICY PROGRESS

A top sub-priority in the Action Plan is to adopt policy incentives and standards to stimulate diverse RH2 demand, and both Washington and Oregon have made major moves recently to do just that:

Washington

- Clean Fuels legislation **HB 1091** includes renewable hydrogen production and infrastructure as eligible investments for fuel credits from revenues earned by utilities from the sale of electricity used for electric vehicle charging.
- **SB 5588** authorizes public utility districts to manufacture and sell renewable hydrogen, paving the way for Douglas County PUD to make the largest electrolyzer purchase in the US by a public utility.
- **SB 5116**, Washington's Clean Energy Transformation Act, qualifies investments in renewable hydrogen infrastructure as eligible Energy Transformation Projects for compliance with the Act.
- **\$2.5 million** appropriation to expand hydrogen fueling infrastructure in Washington.
- **SB 5000** provides a 50% sales tax exemption on new hydrogen fuel cell vehicles and a full tax exemption on used hydrogen fuel cell vehicles.
- **HB 2042** creates tax incentives to accelerate adoption of zero emission vehicles, including fuel cell vehicles and infrastructure.
- **HB 1569** would expand tax credits currently available to renewable hydrogen to the production of electrolytic hydrogen. The bill was introduced in 2021 with bipartisan support, and is due for consideration by the legislature in the 2022 session.

Oregon

- **SB 333** directs the Oregon Department of Energy to study the benefits of production and use of renewable hydrogen to decarbonize Oregon's energy, transportation and industrial sectors and present policy recommendations to the Oregon legislature.
- **HB 2165** raises the cap on hydrogen fuel cell vehicles to qualify them for state Charge Ahead zero emission and electric vehicle rebates.
- **The Western Governors' Association** included fuel cell vehicle infrastructure in its transportation electrification infrastructure initiative.



RESEARCH, DEVELOPMENT & DEPLOYMENT

Another top sub-priority is to invest in research, demonstration and deployment (RD&D) initiatives that can strategically accelerate RH2 commercialization:

JCDREAM and Washington State University

JCDREAM and Washington State University have launched the **Consortium for Hydrogen and Renewably Generated E-Fuels (CHARGE)** to “make Washington State a global hub for commercializing alternative fuels.” CHARGE is bringing together deployment partnerships informed by a broad combination of necessary expertise involving chemical catalysis, systems integration, cryogenic hydrogen, hydrogen safety, grid management and sustainable materials development. The CHARGE Inaugural Conference takes place today, May 20th, convening a who’s who of RH2 leaders from government, utilities, business, and researchers all coming together to share their take on the future of hydrogen and renewably generated e-fuels.

The Leighty Foundation

The Leighty Foundation invites the entire energy industry to “think beyond electricity” to renewables-sourced, CO2-emission-free energy systems based on carbon-free energy carriers, storage media, and fuels (hydrogen and anhydrous ammonia). With this approach, the Foundation helps to accelerate achieving humanity’s urgent Earth protection goals by co-funding and providing input to whole-systems research on the critical “wicked problem” of allocation of capital, markets, and policy among hydrogen systems vis-a-vis the Grid.